

WHAT IS CLAIMED IS:

1. A face image photographing apparatus
comprising photographing means for photographing at
least a face image of a to-be-photographed person,
5 output means for outputting a face image photographed
by said photographing means, and guidance display means
for displaying a photographing state for guiding the
to-be-photographed person when the photographing
operation is effected by said photographing means,
10 wherein said guidance display means displays at
least a position in which the to-be-photographed person
sets an observing point on said photographing means,
displays a message instructing the person to wait for
photographing, an end of photographing, and a direction
15 in which the person should moves after the end of
photographing.

2. A face image photographing method comprising
the steps of:

photographing at least a face image of a to-be-
20 photographed person;

measuring the size of a face of the to-be-
photographed person based on the photographed face
image; and

obtaining a face image with a constant size by
25 subjecting the photographed face image to a zooming
process according to the measured value of the size of
the face measured.

3. The face image photographing method according to claim 2, wherein said step of obtaining the face image with a constant size comprises the steps of:

5 deriving a ratio of the measured value of the face size measured to a target face size value which is an adequate face size and setting the derived ratio as a zoom ratio; and

10 obtaining a face image with a constant size by subjecting the photographed face image to a zooming process according to the zoom ratio.

4. A face image photographing method comprising the steps of:

photographing at least a face image of a to-be-photographed person;

15 measuring the size of a face of the to-be-photographed person based on the photographed face image;

determining whether the measured value of the face size measured is within a specified range;

20 obtaining a face image with a constant size by subjecting the photographed face image to a zooming process according to the measured value of the measured face size when it is determined in said determining step that the measured value of the face size is within
25 the specified range; and

effecting a retry control process for causing a process including said face image photographing

step, said face size measuring step and said step of determining whether the measured value of the face size measured is within the specified range to be effected again when it is determined in said determining step
5 that the measured value of the face size measured is outside the specified range.

5. The face image photographing method according to claims 2, 3 and 4, wherein said step of measuring the size of a face of the to-be-photographed person is
10 effected by detecting positions of at least both pupils in the face of the to-be-photographed person based on the photographed face image and measuring the face size according to the relation of the detected positions of the pupils.

15 6. The face image photographing method according to claims 2, 3 and 4, wherein said step of measuring the size of a face of the to-be-photographed person is effected by detecting positions of at least both pupils and mouth in the face of the to-be-photographed person
20 based on the photographed face image and measuring the face size according to the relation of the detected positions of the pupils and mouth.

7. A face image photographing apparatus comprising:
25 photographing means for photographing at least a face image of a to-be-photographed person;
measuring means for measuring the size of a face

of the to-be-photographed person based on the face
image photographed by said photographing means; and
zoom processing means for obtaining a face image
with a constant size by subjecting the photographed
5 face image to a zooming process according to the
measured value of the face size measured by said
measuring means.

8. The face image photographing apparatus
according to claim 7, wherein said zoom processing
10 means includes:

zoom ratio setting means for deriving a ratio of
the measured value of the face size to a target face
size value which is an adequate face size and setting
the derived ratio as a zoom ratio; and

15 zoom processing means for obtaining a face image
with a constant size by subjecting the face image
photographed by said photographing means to a zooming
process according to the zoom ratio set by said zoom
ratio setting means.

20 9. A face image photographing apparatus
comprising:

photographing means for photographing at least
a face image of a to-be-photographed person;

measuring means for measuring the size of a face
25 of the to-be-photographed person based on the face
image photographed by said photographing means;

determining means for determining whether

a measured value of the face size measured by said measuring means is within a specified range;

zoom processing means for obtaining a face image with a constant size by subjecting the face image photographed by said photographing means to a zooming process according to the measured value of the face size measured by said measuring means when said determining means determines that the measured value of the face size lies within the specified range; and

retry control means for causing the face image photographing process by said photographing means, the face size measuring process by said measuring means and the process by said determining means for determining whether the measured value of the face size is within the specified range to be effected again when said determining means determines that the measured value of the face size is outside the specified range.

10. The face image photographing apparatus according to claims 7, 8 and 9, wherein said measuring means detects positions of at least both pupils in the face of the to-be-photographed person based on the face image photographed by said photographing means and measuring the face size according to the relation of the detected positions of the pupils.

11. The face image photographing apparatus according to claims 7, 8 and 9, wherein said measuring means detects positions of at least both pupils and

mouth in the face of the to-be-photographed person
based on the face image photographed by said
photographing means and measuring the face size
according to the relation of the detected positions of
5 the pupils and mouth.

12. A face image photographing method comprising
the steps of:

photographing at least a face image of a to-be-
photographed person;

10 determining whether the to-be-photographed person
is set in a photographing possible state based on
the photographed face image; and

selecting the photographed face image as
a photographing image when it is determined in said
15 photographing possible state determining step that the
to-be-photographed person is set in the photographing
possible state.

13. A face image photographing method comprising
the steps of:

20 photographing at least a face image of a to-be-
photographed person by plural times and fetching the
photographed face images as a plurality of images;

determining whether the to-be-photographed person
is set in a photographing possible state by monitoring
25 the states of at least eyes and mouth of the face of
the to-be-photographed person based on the plurality of
fetched images; and

selecting one of the plurality of fetched images
which is optimum for outputting as a photographing
image when it is determined in said photographing
possible state determining step that the to-be-
5 photographed person is set in the photographing
possible state.

14. A face image photographing method comprising
the steps of:

photographing at least a face image of a to-be-
10 photographed person by use of photographing means;
detecting that the to-be-photographed person
lies within a photographing range of the photographing
means based on an output of the photographing means;
guiding the to-be-photographed person to
15 make preparation for photographing when the to-be-
photographed person is detected in the photographing
range;

determining whether the to-be-photographed person
is set in a photographing possible state based on the
20 face image photographed by the photographing means
after said guiding step; and

selecting the face image photographed by the
photographing means as a photographing image when it is
determined in said photographing possible state
25 determining step that the to-be-photographed person is
set in the photographing possible state.

15. The face image photographing method according

to claims 13 and 14, wherein said step of determining whether the to-be-photographed person includes the steps of:

5 effecting a retry control process for causing said face image photographing step and said photographing possible state determining step to be effected again when it is not determined in said photographing possible state determining step that the to-be-photographed person is set in the photographing possible state.

10 16. A face image photographing apparatus comprising:

 photographing means for photographing at least a face image of a to-be-photographed person;

15 determining means for determining whether the to-be-photographed person is set in a photographing possible state based on the photographed face image; and

 selecting means for selecting the face image photographed by said photographing means as a photographing image when it is determined by said determining means that the to-be-photographed person is set in the photographing possible state.

20 17. A face image photographing apparatus comprising:

 photographing means for photographing at least a face image of a to-be-photographed person by plural

times and fetching the photographed face images as a plurality of images;

5 determining means for determining whether the to-be-photographed person is set in a photographing possible state by monitoring the states of at least eyes and mouth of the face of the to-be-photographed person based on the plurality of images fetched by said photographing means; and

10 selecting means for selecting one of the plurality of images fetched by said photographing means which is optimum for outputting as a photographing image when it is determined by said determining means that the to-be-photographed person is set in the photographing possible state.

15 18. A face image photographing apparatus comprising:

photographing means for photographing at least a face image of a to-be-photographed person;

20 to-be-photographed person detecting means for detecting that the to-be-photographed person lies within a photographing range of the photographing means based on an output of said photographing means;

25 photographing guiding means for guiding the to-be-photographed person to make preparation for photographing when the to-be-photographed person is detected in the photographing range by said to-be-photographed person detecting means;

determining means for determining whether the
to-be-photographed person is set in a photographing
possible state based on the face image photographed by
said photographing means after the guiding process by
5 said photographing guiding means; and

selecting means for selecting the face image
photographed by said photographing means as a
photographing image when it is determined by said
determining means that the to-be-photographed person is
10 set in the photographing possible state.

19. The face image photographing apparatus
according to claims 16, 17 and 18, wherein said
determining means includes:

retry control means for causing the face image
15 photographing process by said photographing means and
the photographing possible state determining process
by said determining means to be effected again when it
is not determined by said determining means that the
to-be-photographed person is set in the photographing
20 possible state.

20. A face image photographing method comprising
the steps of:

photographing at least a face image of a to-be-
photographed person;

25 detecting the position of pupils based on the
photographed face image;

recognizing the state of the pupils based on the

detected pupil position to determine whether the pupils are normally opened; and

causing the face image photographing process, the pupil position detecting process and the determination process whether the pupils are normally opened to
5 be effected again when it is determined in said determining step that at least one of the pupils is not normally opened.

21. A face image photographing apparatus
10 comprising:

photographing means for photographing at least a face image of a to-be-photographed person;

detecting means for detecting the position of pupils based on the face image photographed by said
15 photographing means;

determining means for recognizing the state of the pupils based on the pupil position detected by said detecting means to determine whether the pupils are normally opened; and

20 retry control means for causing the face image photographing process by said photographing means, the pupil position detecting process by said detecting means and the process by said determining means for determining whether the pupils are normally opened to
25 be effected again when it is determined by said determining means that at least one of the pupils is not normally opened.

22. A face image photographing method comprising the steps of:

photographing at least a face image of a to-be-photographed person;

5 detecting the position of pupils based on the photographed face image;

recognizing the state of the pupils based on the detected pupil position to determine whether the pupils are normally opened;

10 outputting the photographed face image as a photographing image or as a printed image, or to an image storage medium, when it is determined in said determining step that the pupils are normally opened; and

15 causing the face image photographing process, the pupil position detecting process and the process for determining whether the pupil is normally opened to be effected again when it is determined in said determining step that at least one of the pupils is not
20 normally opened.

23. A face image photographing apparatus comprising:

photographing means for photographing at least a face image of a to-be-photographed person;

25 detecting means for detecting the position of pupils based on the face image photographed by said photographing means;

determining means for recognizing the state of the pupils based on the pupil position detected by said detecting means to determine whether the pupils are normally opened;

5 image output means for outputting the face image photographed by said photographing means as a photographing image or as a printed image, when it is determined by said determining means that the pupils are normally opened; and

10 retry control means for causing the face image photographing process by said photographing means, the pupil position detecting process by said detecting means and the process by said determining means for determining whether the pupil is normally opened
15 to be effected again when it is determined by said determining means that at least one of the pupils is not normally opened.

24. The face image photographing apparatus according to claims 21, 23, wherein said detecting
20 means detects the face contour position based on the face image photographed by said photographing means, derives an approximate positional area of the pupils which lies in a relative position with respect to the detected face contour position based on the detected
25 face contour position and extracts positions of the pupils based on the derived approximate positional area of the pupils.

25. The face image photographing apparatus according to claims 21 and 23, wherein said determining means determines whether the number of pupil positions detected by said detecting means is larger than
5 a preset specified value, compares shapes of peripheral portions of the detected pupil positions with preset pupil sample data if it is determined that the number of detected pupil positions is larger than the specified value, determines whether the degree of
10 similarity of one of the detected pupil positions which has the highest degree of similarity is larger than a preset threshold value, determines that the pupils are normally opened if the highest degree of similarity is larger than the preset threshold value,
15 and determines that at least one of the pupils is not normally opened in one of a case wherein the highest degree of similarity is not larger than the preset threshold value and a case wherein the number of detected pupil positions is detected to be not larger
20 than the specified value.

26. The face image photographing apparatus according to claims 21 and 23, wherein said retry control means effects the retry process after waiting for a preset specified period of time when said
25 determining means determines that at least one of the pupils is not normally opened.

27. A face image photographing apparatus

comprising:

photographing means for photographing at least a face image of a to-be-photographed person;

5 detecting means for detecting the position of pupils based on the face image photographed by said photographing means;

determining means for recognizing the state of the pupils based on the pupil position detected by said detecting means to determine whether the pupils are normally opened;

10 image storing means for storing the face image photographed by said photographing means when it is determined by said determining means that the pupils are normally opened; and

15 retry control means for causing the face image photographing process by said photographing means, the pupil position detecting process by said detecting means and the process by said determining means for determining whether the pupils are normally opened to be effected again when it is determined by said

20 determining means that at least one of the pupils is not normally opened.

28. A face image photographing method comprising the steps of:

25 photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

storing the fetched successive images of the plurality of frames as a backup image;

printing and outputting an image of a preset frame in the stored successive images of the plurality of frames;

selecting an image of a desired frame suitable for outputting of the face image from the stored successive images of the plurality of frames when the printed and output image is not adequate; and

printing and outputting the selected image.

29. A face image photographing method comprising the steps of:

photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

storing the fetched successive images of the plurality of frames as a backup image;

recognizing the state of pupils based on the image of a preset frame in the stored successive images of the plurality of frames and determining whether the pupil state is suitable for printing/outputting of the face image;

printing and outputting the image of the preset frame when it is determined in said determining step that the pupil state is suitable for printing/outputting of the face image;

causing said determining step to be effected again

by use of an image of a frame next to the image of the preset frame in the stored successive images of the plurality of frames when it is determined in said determining step that the pupil state is not suitable for printing/outputting of the face image;

5 selecting an image of a desired frame suitable for outputting of the face image from the stored successive images of the plurality of frames when the printed and output image is not adequate; and

10 printing and outputting the selected image.

30. A face image photographing apparatus comprising:

image fetching means for photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

15 image storing means for storing the successive images of the plurality of frames fetched by said image fetching means as a backup image;

20 first printing/outputting means for printing and outputting an image of a preset frame in the successive images of the plurality of frames stored in said image storing means;

25 image selecting means for selecting an image of a desired frame suitable for outputting of the face image from the successive images of the plurality of frames stored in said image storing means when the image

printed and output by said first printing/outputting means is not adequate; and

second printing/outputting means for printing and outputting the image selected by said image selecting means.

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31. A face image photographing apparatus comprising:

image fetching means for photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

10

image storing means for storing the successive images of the plurality of frames fetched by said image fetching means as a backup image;

15

determining means for recognizing the state of pupils based on the image of a preset frame in the successive images of the plurality of frames stored in said image storing means and determining whether the pupil state is suitable for printing/outputting of the face image;

20

first printing/outputting means for printing and outputting the image of the preset frame when said determining means determines that the pupil state is suitable for printing/outputting of the face image;

25

retry control means for causing said determining means to effect the determining process again by use of an image of a frame next to the image of the preset

frame in the successive images of the plurality of frames stored in said image storing means when said determining means determines that the pupil state is not suitable for printing/outputting of the face image;

5 image selecting means for selecting an image of a desired frame suitable for outputting of the face image from the successive images of the plurality of frames stored in said image storing means when the image printed and output by said first
10 printing/outputting means is not adequate; and

 second printing/outputting means for printing and outputting the image selected by said image selecting means.

32. The face image photographing apparatus
15 according to claim 31, wherein said determining means detects a face contour position from the image of the preset frame in the successive images of the plurality of frames stored in said image storing means, derives an approximate positional area of pupils which lies
20 in a relative position with respect to the contour position based on the detected face contour position, extracts positions of both pupils based on the derived approximate positional area of the pupils, recognizes the pupil state based on the extracted positions of
25 both of the pupils, and determines whether the pupil state is suitable for outputting of the face image according to whether the pupils are normally opened.

33. The face image photographing apparatus according to claim 32, wherein said first printing/outputting means derives a central position between both of the pupils based on the extracted positions of the pupils, determines an image cut-out area by deriving a relative position with respect to the derived central position, cuts out an image in the determined image cut-out area from the image of the preset frame and printing and outputting the cut-out image.

34. A face image photographing apparatus comprising:
image fetching means for photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

image storing means for storing the successive images of the plurality of frames fetched by said image fetching means as a backup image;

first determining means for recognizing the state of pupils based on the image of a preset frame in the successive images of the plurality of frames stored in said image storing means and determining whether the pupil state is suitable for printing/outputting of the face image;

first printing/outputting means for printing and outputting the image of the preset frame when

said first determining means determines that the pupil state is suitable for printing/outputting of the face image;

5 retry control means for causing said determining means to effect the determining process again by use of an image of a frame next to the image of the preset frame in the successive images of the plurality of frames stored in said image storing means when said first determining means determines that the pupil state
10 is not suitable for printing/outputting of the face image;

 second determining means for counting the number of retry processes by said retry control means and determining whether the counted value reaches a preset
15 specified value;

 error processing means for effecting an error process when said second determining means determines that the number of retry processes reaches the specified value;

20 image selecting means for selecting an image of a desired frame suitable for outputting of the face image from the successive images of the plurality of frames stored in said image storing means when the image printed and output by said first printing/outputting
25 means is not adequate; and

 second printing/outputting means for printing and outputting the image selected by said image selecting

means.

35. A face image photographing method comprising the steps of:

5 photographing at least face images of a to-be-
photographed person and fetching the face images as
successive images of a plurality of frames;

 storing the fetched successive images of the
plurality of frames as a backup image;

10 storing and outputting an image of a preset frame
in the stored successive images of the plurality of
frames with respect to one of a storage device such as
a filing device and other storage medium;

 selecting an image of a desired frame suitable for
outputting of the face image from the stored successive
15 images of the plurality of frames when the output image
is not adequate; and

 outputting the selected image.

36. A face image photographing method comprising the steps of:

20 photographing at least face images of a to-be-
photographed person and fetching the face images as
successive images of a plurality of frames;

 storing the fetched successive images of the
plurality of frames as a backup image;

25 recognizing the state of pupils based on the image
of a preset frame in the stored successive images of
the plurality of frames and determining whether the

pupil state is suitable for printing/outputting of the face image;

storing and outputting the image of the preset frame with respect to one of a storage device such as a filing device and other storage medium when it is
5 determined in said determining step that the pupil state is suitable for outputting of the face image;

causing said determining step to be effected again by use of an image of a frame next to the image of the
10 preset frame in the stored successive images of the plurality of frames when it is determined in said determining step that the pupil state is not suitable for outputting of the face image;

selecting an image of a desired frame suitable for
15 outputting of the face image from the stored successive images of the plurality of frames when the output image is not adequate; and

outputting the selected image.

37. A face image photographing apparatus
20 comprising:

image fetching means for photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

25 image storing means for storing the successive images of the plurality of frames fetched by said image fetching means as a backup image;

first outputting means for storing and outputting the image of a preset frame in the successive images of the plurality of frames stored in said image storing means with respect to one of a storage device such as
5 a filing device and other storage medium;

image selecting means for selecting an image of a desired frame suitable for outputting of the face image from the successive images of the plurality of frames stored in said image storing means when the
10 image output by said first outputting means is not adequate; and

second outputting means for outputting the image selected by said image selecting means.

38. A face image photographing apparatus
15 comprising:

image fetching means for photographing at least face images of a to-be-photographed person and fetching the face images as successive images of a plurality of frames;

20 image storing means for storing the successive images of the plurality of frames fetched by said image fetching means as a backup image;

determining means for recognizing the state of pupils based on the image of a preset frame in the
25 successive images of the plurality of frames stored in said image storing means and determining whether the pupil state is suitable for printing/outputting of the

face image;

first outputting means for outputting the image of the preset frame to one of a storage device such as a filing device and other storage medium when said determining means determines that the pupil state is
5 suitable for outputting of the face image;

retry control means for causing said determining means to effect the determining process again by use of an image of a frame next to the image of the preset
10 frame in the successive images of the plurality of frames stored in said image storing means when said determining means determines that the pupil state is not suitable for outputting of the face image;

image selecting means for selecting an image of
15 a desired frame suitable for outputting of the face image from the successive images of the plurality of frames stored in said image storing means when the image output by said first outputting means is not adequate; and

20 second outputting means for outputting the image selected by said image selecting means.

39. A face image photographing apparatus comprising:

photographing means for photographing at least
25 a face image of a to-be-photographed person;

indicating means for indicating a reference position (which is a glabella portion of the face) with

respect to the position of pupils based on the face
image photographed by said photographing means;

calculating means for calculating a cut-out range
of the face image photographed by said photographing
5 means based on the reference position indicated by said
indicating means; and

image outputting means for outputting a cut-out
image of the face image photographed by said
photographing means based on the cut-out range
10 calculated by said calculating means.

40. A face image photographing apparatus
comprising:

photographing means for photographing at least a
face image of a to-be-photographed person;
15 indicating means for indicating a reference
position with respect to the position of pupils based
on the face image photographed by said photographing
means;

calculating means for calculating an area
20 containing the pupils based on the reference position
indicated by said indicating means;

determining means for recognizing the pupil
state based on at least the face image of the to-be-
photographed person in the area containing the pupils
25 calculated by said calculating means; and

image outputting means for outputting the face
image photographed by said photographing means as

a photographing image when said determining means determines that the pupils are normally opened.

41. A face image photographing apparatus comprising:

5 photographing means for photographing at least a face image of a to-be-photographed person;

 indicating means for indicating a reference position with respect to the position of pupils based on the face image photographed by said photographing
10 means;

 calculating means for calculating an area containing the pupils based on the reference position indicated by said indicating means;

 determining means for recognizing the pupil
15 state based on at least the face image of the to-be-photographed person in the area containing the pupils calculated by said calculating means;

 image outputting means for outputting the face image photographed by said photographing means
20 as a photographing image when said determining means determines that the pupils are normally opened; and

 retry control means for causing the face image photographing process, the process for indicating the
25 reference position with respect to the pupil positions, the process for calculating the pupil positions, and the process for determining whether the pupils are

normally opened to be effected again when said determining means determines that at least one of the pupils is not normally opened.

5 42. The face image photographing according to claim 41, wherein said determining means determines whether the number of pupil positions detected by said detecting means is larger than a preset specified value, compares shapes of peripheral portions of the detected pupil positions with preset pupil
10 sample data if it is determined that the number of detected pupil positions is larger than the specified value, determines whether the degree of similarity of one of the detected pupil positions which has the highest degree of similarity is larger than
15 a preset threshold value, determines that the pupils are normally opened if the highest degree of similarity is larger than the preset threshold value, and determines that at least one of the pupils it not normally opened in one of a case wherein the highest
20 degree of similarity is not larger than the preset threshold value and a case wherein the number of detected pupil positions is detected to be not larger than the specified value.

25 43. A face image photographing apparatus comprising:

image fetching means for photographing at least face images of a to-be-photographed person and fetching

the face images as successive images of a plurality of frames;

display means for sequentially displaying the successive images of the plurality of frames fetched by
5 said image fetching means;

image selecting means for selecting an image of a desired frame suitable for outputting of the face image from the successive images of the plurality of frames displayed on said display means; and

10 output means for outputting an image of a frame displayed on said display means immediately before the image is selected by said image selecting means as an image of a desired frame suitable for outputting of the face image.